Exterity PRO/SDI Encoder Administrator's Guide

Notices

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Document Reference

1300-0009-0001

Edition

1.3 Issue 1 (January 2009)

Printed in UK

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Products Covered By This Guide

- PRO Encoder (idapt/trdpt/prdpt-pro)
- RGBS Encoder (idapt/trdpt-pes)
- SDI Encoder (idapt/trdpt/prdpt-sdi)

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support@exterity.co.uk

Safety Notices

Before installing and operating these products, please read the safety information in this manual.

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Important Safety Instructions

There are no instructions specifically for service personnel in this document. There are no user serviceable parts inside any Exterity product. To prevent electric shock or fire hazard, do not remove cover. Refer service to qualified service personnel.

This chapter contains important safety information. If you are unsure about any of the information in the section, please contact Exterity.

The lightning flash with arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage " within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

USA and Canada

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the instructions contained in this manual.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.

12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
16. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
17. The mains plug of the power supply cord shall remain readily operable.

WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

EU and Others

Do not proceed beyond a **WARNING** notice until you have understood the hazardous conditions and have taken appropriate steps.

Safety Information

WARNING: There are no user serviceable parts inside any Exterity product. To prevent electric shock or fire hazard, do not remove cover. Refer service to qualified service personnel.

WARNING: For 230/240 volt operation, be sure to use a harmonised grounded 3 conductor cord, rated 6 Amp minimum. Use a suitable cord for connection to the equipment and terminating in an IEC approved plug.

This equipment relies upon a safety earth for operation, ensure that you always use a power cord with appropriate earth and that the inlet to which is inserted also has the appropriate earth. If in any doubt about the earth provision in your building consult a qualified electrician

WARNING: Use only the dedicated power supply or cord supplied for your device.

WARNING: The Exterity products use ventilation holes for cooling. None of the ventilation holes should be blocked. Keep all materials at least 5cm away from all the ventilation holes.

WARNING: Do not expose the product to any rain or moisture.

WARNING: Do not use the product near a naked flame e.g. a candle.

WARNING: The operating conditions of the product should be 0°C-40°C with a Relative Humidity of 5 – 95%. The product should not be operated outside of these conditions.

There are no user-serviceable parts inside these products. Any servicing, adjustment, maintenance, or repair must only be performed by service-trained personnel.

About this Manual

Summary

This manual explains how to set up, use and manage the Exterity PRO/SDI Encoder (the "encoder"). The encoder is a network device which takes a signal from an AV device (e.g. a DVD player or set-top box) and outputs it as an MPEG-2 or MPEG-4 stream over an IP network.

Scope

This edition of the manual refers to version 1.3.x of the encoder software. The following products are covered:

- PRO Encoder
- RGBS Encoder
- SDI Encoder

Audience

This manual is intended for use by systems integrators or systems administrators who are installing and setting up Exterity products. The manual assumes that readers are familiar with installing and configuring network-based products.

Associated documentation

This manual should be used in conjunction with the following documents:

- idaptor Installation Guide
- tridaptor Installation Guide
- prodaptor Installation Guide

Terms and definitions

The following terms and definitions are used in this document:

Composite video – A type of analogue video signal where the luminance, chrominance and sync signals are all carried on a single cable. This is often referred to as CVBS.

DHCP – Dynamic Host Configuration Protocol, a protocol used to allocate IP addresses to devices on an IP network.

IGMP – Internet Group Management Protocol, a protocol used to manage multicast traffic on an IP network.

IP – Internet Protocol, a protocol used for communicating data across a network using the Internet Protocol Suite, also referred to as TCP/IP.

MPEG – A family of compression methodologies for audio and video.

MPEG Transport Stream - a communications protocol enabling multiplexing of digital audio, video and data which is specified in MPEG-2 Part 1, Systems (ISO/IEC standard 13818-1).

RGB - A type of component analogue video signal consisting of three signals - red, green, and blue - carried on three separate cables.

RGBS – A specific type of RGB where the video sync signal is carried on a fourth cable.

RGsB - A specific type of RGB where the video sync signal is carried on the green cable.

RTP - Real-time Transport Protocol, a protocol used to carry real time data on an IP network.

SAP – Session Announcement Protocol, a protocol used to advertise the presence of multicast sessions on an IP network.

SDI – Synchronous Digital Interface, a high speed serial interface that carries uncompressed digital video with the option of embedded digital audio.

TFTP – Trivial File Transfer Protocol, a simple file transfer protocol used on IP networks.

UDP – User Datagram Protocol, a transport protocol in the TCP/IP suite, providing a connectionless transport mechanism with low overhead.

YPbPr – A type of component analogue video signal consisting of a colourless component (luminance), combined with one or more colour-carrying components (chrominance). This is commonly referred to simply as "component".

How this manual is organised

This manual is organised as follows:

Section 1 – Device Setup	This section describes basic aspects of setting up the encoder.
Section 2 – Physical Interfaces	This section describes how to connect your AV equipment to the encoder.
Section 3 – General Use	This section describes the basic operation of the encoder.
Section 4 – Management Interfaces	You can manage the encoder using the IPTV Manager, web management interface and admin interface. These are described in this section.
Section 5 – Status Monitoring	This section explains how to check the operating status of the encoder.
Section 6 – Device Management	This section provides detailed information on the configuration options available with the web management interface.
Section 7 – Admin Interface	This section describes how to use the serial admin interface.
Section 8 – Troubleshooting	Review this section if you are having problems.

1 Device Setup

The device's default configuration means it will operate "out of the box" without the use of the management interface. This section describes this basic setup.

AV Source

Before the encoder can stream audio/video on the network, an AV source must be connected. See section 2 on Physical Interfaces for details on how to connect your AV equipment to the encoder.

Network setup

By default, the device requires a DHCP Server to be available on the network to assign it an IP address. Once an IP address is assigned, a static IP address can be configured via the management interface if this is desired; this would allow continued operation without a DHCP Server.

Alternatively, a static IP address can be configured via the serial admin port. This would allow operation without a DHCP server.

Note: In order to avoid unnecessary network traffic, please ensure that the encoder is attached to a multicast-enabled network.

2 Physical Interfaces

The Encoder currently offers three different physical interfaces: the Professional Interface, the RGBS interface and the SDI Interface. Encoder cards can be found in single-unit idaptors, triple-unit tridaptors or in prodaptor chassis.

In an idaptor or tridaptor, the encoder card is a self-contained unit with interfaces for network and admin on its front panel and AV interfaces on its rear panel.

In a prodaptor chassis, the card has AV interfaces on its rear panel, while its edge connector enables it to access network and admin ports via the chassis front panel.

Front Panel Interface (idaptor/tridaptor)

The front panel of the Encoder is shown in Figure 1 and its interfaces are described below.

Figure 1 Encoder Front Panel (idaptor format)

Ethernet interface (10/100Mbps)

The Ethernet Interface has two LEDs which show the status of the Ethernet Interface; these are marked Link and Activity. In normal operation Link will be permanently lit if the connection is 100Mbps and off if it is 10Mbps. Activity will flicker rapidly on reception or transmission of packets.

Admin interface

Serial RS232 Interface running at 115200 baud, 8 data bits, 1 stop bit, no parity. The Admin interface has two LEDs (normally green, however the colour is of no consequence). They should both be lit indicating the two main power rails of the product are on.

DC inlet (24V DC)

The DC jack is used to power an idaptor encoder. It is not used on the tridaptor and will not work.

Use only the 24V DC power supply provided by Exterity with your idaptor. Using a different power supply may damage the product and will invalidate the warranty.

Fan

In an idaptor, the fan is essential to keep the unit at its correct operating temperature. Make sure the fan nor any of the other air holes in the unit are ever blocked.

Encoder modules in a tridaptor do not have a fan.

Reset Button

The Reset function is in fact a power down button. Pressing this button momentarily removes power from the unit, resetting the board. Do not press this button or remove power from the unit while the unit is upgrading or updating its configuration as a result of Administrator action. Either of these actions could corrupt the FLASH Memory in the unit and require a return to factory.

Pressing the Reset button on a module in a tridaptor powers down or resets one module; it will not affect the operation of the other two modules.

Status LED

The Status LED is blue and provides an indication of the current state of the unit without using any of the management interfaces. The patterns, in time order as it boots, are as follows:

Pattern (approx rate)	**Description**
Twice a Second	running Power on Self Tests
Solid On	Booting operating System, takes approximately 10-20 seconds
Once a second	Heartbeat indicates unit is running normally

Table 1 Status LED Patterns, normal operation

If the unit is being upgraded then once it boots the operating system and after the LED is solid on then the LED pattern is as follows:

Pattern (approx rate)	**Description**
< 1 a second	Erasing FLASH
>10 a second	Writing FLASH

Table 2 Status LED Patterns, FLASH Programming

On no account should you power the unit off while it is performing either of these two steps.

The unit's normal operating state is a steady once a second (roughly) heart beat. If the status LED is solid on, solid off or very rapidly beating for a prolonged period of time (more than 5 or 10 minutes) there is probably a fault.

Front Panel Interface (prodaptor)

The Encoder module for the prodaptor provides the following interfaces over its edge connector to the prodaptor chassis. The actual physical interfaces can be found on the chassis front panel.

- Ethernet interface (10/100Mbps)
- Admin interface
- Status LEDs
- Power supply

Please refer to the prodaptor installation guide for further details.

Heartbeat LED

The heartbeat LED (marked H/B) on the prodaptor front panel is equivalent to the status LED on the idaptor/tridaptor front panel. See the above section on the idaptor/tridaptor front panel for an explanation of the behaviour of the LED.

Rear Panel Interfaces

Professional Interface

The Professional Interface provides video and audio inputs as follows; these are illustrated in Figure 2.

Figure 2 PRO Encoder Rear Panel (prodaptor format)

Video Inputs

The three BNC connectors for video input support:

- Composite (Connect the composite signal to the Y input)
- Component (Connect the Y signal to the Y input, the Pb/Cb/U signal to the Cb input and the Pr/Cr/V signal to the Cr input)
- RGsB (RGB with Sync on Green. Connect R to Cr, G to Y, B to Cb)

Audio Inputs

The two 6.35mm jack sockets for audio input support:

- Balanced audio (Connect to both left and right inputs via adaptors such as the one shown in Figure 4)
- Unbalanced audio (Connect mono or stereo audio to the Left/Stereo input via an adaptor such as the one shown in Figure 3)
- AES audio (Connect AES audio to the Right/Digital input via an adaptor such as the one shown in Figure 4)

Note: Configuration of audio type is available in the web interface on later interface boards. If you have an earlier interface board and require to change the audio input type, please contact your supplier. To check the type of interface board, go to the **General** page in the web interface. Old boards are identified by **FAR-B** in the product type field. Newer boards are identified by **FAR-C** in this field.

Figure 3 Unbalanced audio adaptor

Figure 4 Balanced audio/AES audio adaptor

IR Out Socket

This is intended to control the attached AV device. The associated IR transmitter is provided with the unit.

Note: On older units the IR Out socket may be found on the front panel.

RGBS Interface

The RGBS Interface provides video and audio inputs as follows; these are illustrated in Figure 5.

Figure 5 RGBS Encoder Rear Panel (idaptor format)

Video Inputs

The four BNC connectors for video input support:

- Composite (Connect the composite signal to the G input)

- RGBS (Connect the red signal to the R input, the green signal to the G input, the blue signal to the B input and the sync signal to the SYNC input. Note that your sync signal may come from the Composite output on your AV device)

Audio Inputs

The two 6.35mm jack sockets for audio input support:

- Balanced audio (Connect to both left and right inputs via adaptors such as the one shown in Figure 4)
- Unbalanced audio (Connect mono or stereo audio to the Left/Stereo input via an adaptor such as the one shown in Figure 3)
- AES audio (Connect AES audio to the Right/Digital input via an adaptor such as the one shown in Figure 4)

IR Out Socket

This is intended to control the attached AV device. The associated IR transmitter is provided with the unit.

Note: On older units the IR Out socket may be found on the front panel.

SDI Interface

The **Serial Digital Interface** (SDI) is a high speed serial interface that carries uncompressed video with the option of embedded audio. Specified as ITU-R BT.656 and SMPTE 259M, it is a digital video interface typically used for broadcast-grade video. The SDI rear panel is illustrated in Figure 6.

Figure 6 SDI Encoder Rear Panel (idaptor format)

The SDI board offers two physical interfaces:

- Single BNC (SDI video, SDI video with embedded audio)
- Female XLR (AES audio)

This allows the user to encode audio from the SDI interface or to use the AES interface as the audio source.

Note the BNC interface is marked with ASI/SDI as this interface is common to the SDI Encoder and ASI Gateway. The interface is committed to SDI or ASI in the factory and cannot have its function changed in the field.

3 General Use

Channel Announcement

The device announces its stream (channel) every 30 seconds using the SAP protocol. The information in the announcements enables client (receiver) devices to attach to the stream. SAP announcements are sent to multicast address 239.255.255.255, port 9875.

AV Source

The device starts streaming (transmitting an MPEG stream on the IP network) automatically when an AV source of correct format is connected. The default video interface setting is Component.

Stream Output

By default the device transmits audio/video as a transport stream over UDP to the multicast address 239.192.x.y, port 49408, where x and y are the last two digits of the device's own IP address. The default bit rate is 4Mbps.

Infra-red control of AV Source

The Encoder has the ability to send infra-red remote control commands to the attached AV source. These commands are sent based on commands received over the network from IPTV Manager or an IPTV receiver. To do this it is necessary to obtain a configuration file with the remote control codes for that particular device.

This functionality is illustrated in Figure 7 where, for example, the remote control handset could be used to play/pause/stop the DVD player.

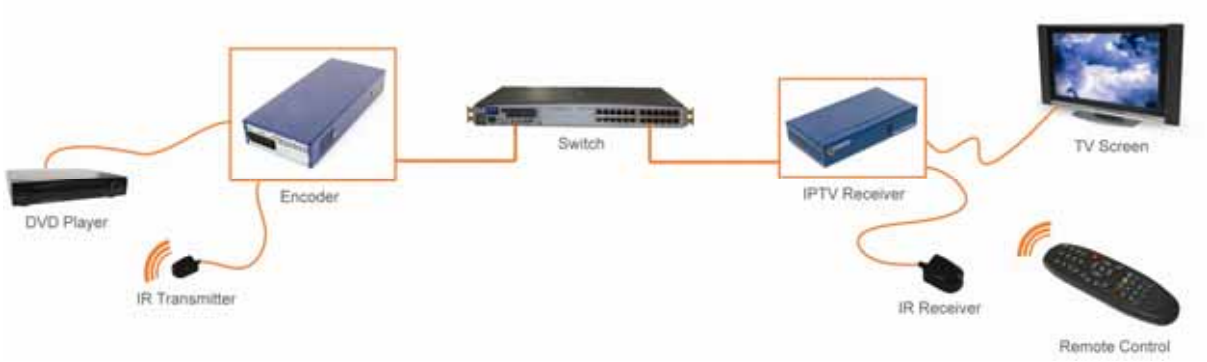


Figure 7 IR Control of AV Source

4 Management Interfaces

The encoder has three management interfaces as follows:

- IPTV Manager
- Web Interface
- Admin Interface

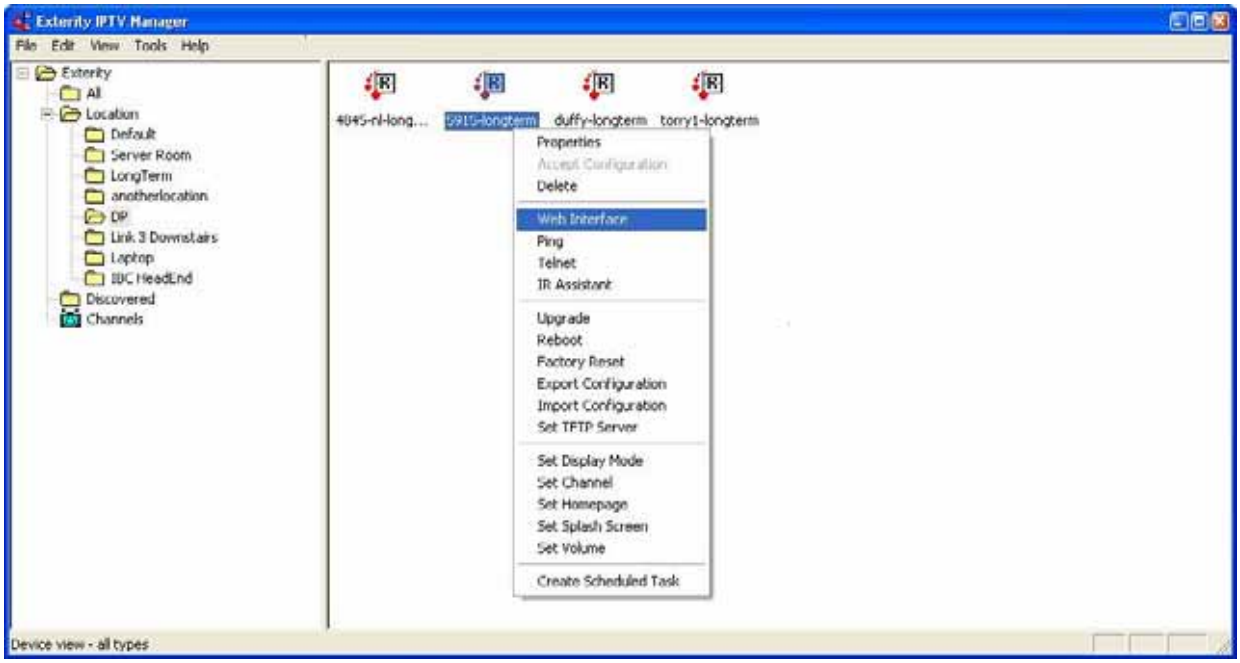
Note that each encoding module in a tridaptor Encoder is required to be configured independently.

IPTV Manager

The IPTV Manager is a Windows application which discovers Exterity devices on the network and uses SNMP to manage a subset of device functionality. It can also be used to start the device web interface as shown below.

Note: You can also use a third-party SNMP tool to manage the encoder. Contact Exterity to obtain the Management Information Base (MIB).

For more details on using the IPTV Manager, see the associated manual.



Web Interface

You can manage every aspect of the encoder's functionality using the its web management interface.

You can display the web management interface using the IPTV Manager as shown above, or by typing the encoder IP address directly into your browser:

Use the web management interface as follows:

1. When prompted, enter the correct username and password. The default login details are:

   Username: admin
   Password: labrador

2. The web management interface opens in your browser as shown in Figure 8.

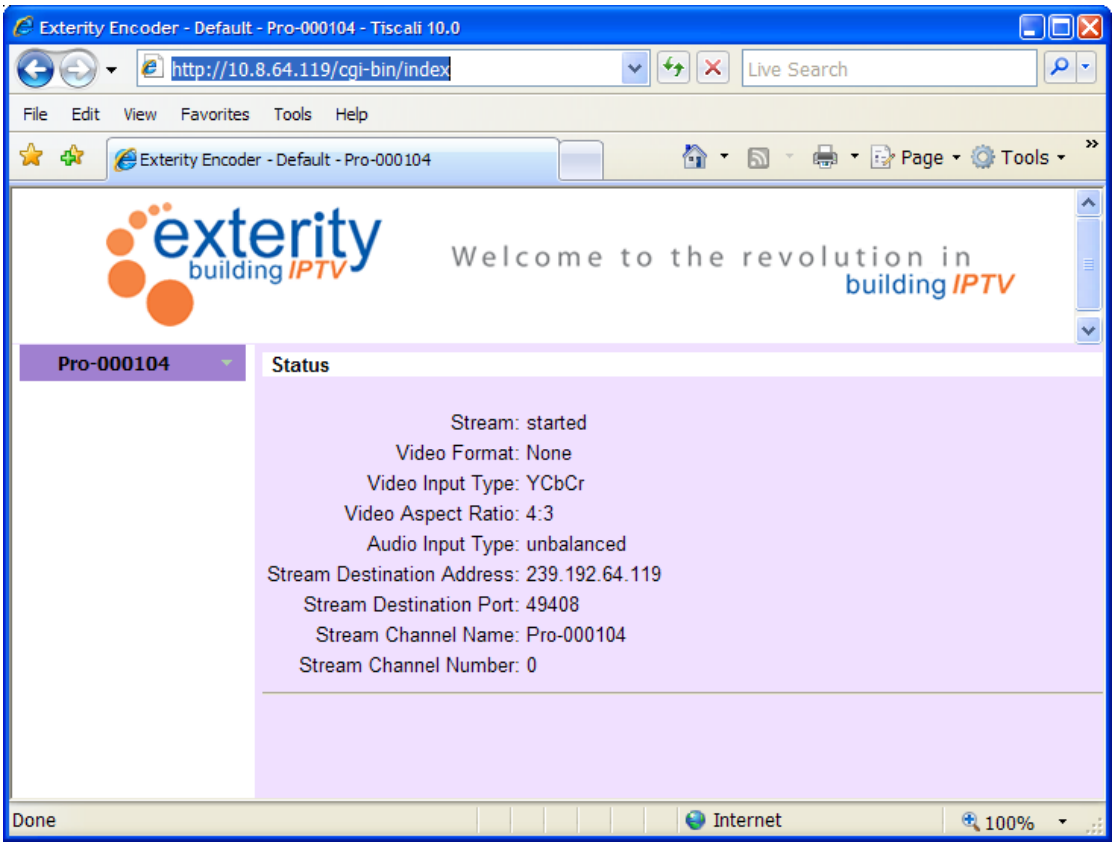


Figure 8 Web management interface

3. Clicking on the encoder name on the left hand side will reveal the menu. Use this menu to navigate through the tabs, changing settings as appropriate. Click **Apply** on each tab to save your changes.

Section 5 – Device Management describes the web management interface options in detail.

Authentication

You can control access to the web management interface by changing the login details.

To change the admin password:

1. Click on the **Authentication** tab.
2. Specify a password and click **Apply**.

Admin Interface

In certain circumstances it may not be possible to manage an encoder via its web interface. For these situations a text based admin interface is provided which is available via the serial interface (marked admin on the rear panel of the unit) or via telnet.

For details on use of the admin interface, see **Section 7 - Admin Interface**.

5 Status Monitoring

This section explains how to discover the operating status of an encoder.

Product Identification

To view details about the device, including MAC address and software version, choose the **General** page on the web interface. The information displayed here is as follows:

Software version

The current software version running on the device.

Description

A unique string identifying this particular software version.

Serial number

The MAC address of the device.

IP address

The IP address in use on the device, either configured statically or assigned by DHCP.

Product type

Identifies the exact type of hardware in use on the unit.

Daughtercard

Indicates which interface type is on this device.

Uptime

The length of time since the last power-on or reboot.

Operating Status

To view details such as the streaming status of the device, choose the **Status** page on the web interface. The information displayed here is as follows:

Stream

Provides information on the status of the stream. This will be one of the states described in the table below.

Status	Description
Waiting	The encoder has been unable to find a suitable video source. For example with analogue video this would typically mean a lack of Sync signal. Check the video cable(s) has/have been correctly attached to the unit and that the video source is turned on and working.
Initialising	The Encoder is setting up the internal hardware to stream in the configured manner. This is a transient state and should be seen for only a few seconds. If you see this, refresh the page and the status

	should change to Started. If this does not happen and this state persists there is possibly a hardware fault. Power cycle the unit and try again. If the fault persists contact your supplier.
Started	The unit is currently streaming
Stopped	User has deliberately stopped streaming or has not attempted to start streaming. If there is a string following this message this usually indicates an error of some form for example "SDI audio set up failed". Errors here will often indicate some form of hardware error; contact your supplier

Video Format

If possible this gives an indication of the composite video format. This will be one of:

- PAL
- NTSC
- None – if the video is not composite, the video is black and white or the product cannot detect whether it is encoded in either PAL or NTSC

Video Input Type

Shows which video type the encoder is currently configured to expect, as configured on the **Input** page. This will be one of:

- YCbCr
- RGsB
- RGB
- Composite

Video Aspect Ratio

Indicates the configured aspect ratio, as configured on the **Input** page. This will be one of:

- 4:3
- 16:9

Audio Input Type

Shows the currently configured audio input type. This will be one of:

- Balanced
- Unbalanced
- AES

Stream Destination Address

Displays the currently configured multicast address, as configured in the **Stream** page. If multiple destinations have been configured, these are not displayed here, but on the **Stream** page.

Stream Destination Port

The currently configured destination port number, as configured in the **Stream** page.

Stream Channel Name

Shows the currently configured channel (or device) name, as configured in the **Announcements** page.

Stream Channel Number

The currently configured channel number, as configured in the **Announcements** page.

Network Statistics

Viewing the network port utilisation is an easy way to check if the encoder is transmitting data at the rate expected by the streaming settings.

To view network port utilisation, go to the **Network** page on the web interface. The Ethernet interface statistics are shown at the bottom of the page. The **transmit utilisation** should approximately match the rate specified on the **Stream** page. You would normally expect to see very little traffic on the receive side.

Viewing Stream

To view the stream in a browser window, first ensure that the Exterity MPEG codecs and avediaPlayer are installed on the PC.

Now go to the **Stream** page on the web interface and click **View Stream In New Window**. This will open a new browser window to play the stream.

6 Device Management

This section of the manual describes how to manage the encoder using the web management interface. All procedures described in this section assume that you are running the web management interface, as described in **Section 4 – Management Interfaces**.

Note: When making changes using the web management interface, click **Apply** to save your changes on each tab before moving to another tab, otherwise your changes will be lost.

General

The **General** tab displays hardware and software information about the device you are using and allows you to name the device and its location.

To specify a name for the device:

Enter the name into the **Name** box and click **Apply**. The name you specify is used to identify the device on a management station.

To specify a location for the device:

Type the name of a location into the location folder and click **Apply**.

The location you specify is used by the IPTV Manager to organise devices into folders. For example, if you specify **Group 1**, the device appears in `Location\Group 1` in the IPTV Manager.

Network Settings

IP Address Settings

You can configure the encoder to obtain an IP address automatically using DHCP, or you can specify static addressing information, such as IP address, subnet mask and default gateway.

Note: Changes to IP addressing take place immediately on clicking Apply.

To configure the device to be allocated an IP address automatically:

1. Click on the **Network** tab.
2. Click **Obtain an IP Address automatically**.
3. Click **Apply**.

To configure a static IP address:

1. Click on the **Network** tab.
2. Click **Use the properties below**.
3. Specify values for **IP Address**, **Subnet Mask**, **Default Gateway, DNS**.
4. Click **Apply**.

Ethernet Settings

The encoder's Ethernet interface is a 10/100 port with auto-negotiation enabled by default. It is possible to disable auto-negotiation and run the interface with fixed settings of 100Mbps full duplex (100FD).

Note: In order to avoid Ethernet errors, ensure that the encoder's interface settings match the settings for the network switch port the encoder is connected to. This means that both devices should be configured for auto-negotiation, or both devices should be configured for a fixed setting of 100FD.

To enable/disable auto-negotiation:

1. Click on the **Network** tab.
2. Choose an option from the **Auto-negotiation** box.
3. Click **Apply**.

Note: If auto-negotiation is enabled, the **Network Port Configuration** section on the **Network** tab shows the values for speed and duplex negotiated with the switch.

Audio/Video

Video Input (PRO/RGBS only)

Video Interface sets the type of video input to the device. Valid settings on the PRO encoder are **Composite**, **YCbCr** (Component) and **RGsB** (RGB with sync on green). Valid settings on the RGBS encoder are **Composite** and **RGB** (RGB with external sync).

This should be set to match the type of video output from the attached AV source. See chapter 2 for details on how to attach your AV source to the encoder.

To specify the video input:

1. Click on the **Input** tab.
2. Choose an option from the **Video Input** box.
3. Click **Apply**.

Video Aspect Ratio

Choose the correct video aspect ratio of your video source i.e. **4:3** (normal) or **16:9** (widescreen). This will ensure that receivers and clients will display the picture in the correct format.

To specify the aspect ratio:

1. Click on the **Input** tab.
2. Choose an option from the **Video Aspect Ratio** box.
3. Click **Apply**.

Inverse Telecine Mode

Film materials are recorded at 24 frames per second. When these materials are converted to NTSC, additional fields are added to make 30 frames per second. Normally, a video frame consists of two fields, but when an additional field is inserted, that video frame consists of three fields, and one of the fields is a repeat of the previous field. If you know that the video input is a film material, you can enable the inverse telecine detection to increase picture encoding quality.

To enable inverse telecine mode:

1. Click on the **Input** tab.
2. Check the **Inverse Telecine Mode** box.
3. Click **Apply**.

VCR Mode (PRO/RGBS only)

Because of the electrical mechanical nature of VCRs they tend to produce video which has an unstable time base. Selecting this mode helps the encoder deal with this more effectively. Take care not to select this mode if you are not using a VCR as it can have a detrimental effect on a more stable (usually digital) source such as a DVD player.

To enable VCR mode:

1. Click on the **Input** tab.
2. Check the **VCR Mode** box.
3. Click **Apply**.

Audio Input

For a PRO or RGBS board there are three options available: **Balanced**, **Unbalanced** and **AES**. See chapter 2 for details on audio connections.

For an SDI board there are two options available: **AES** and **embedded**. If **AES** is selected, the module will encode audio from the digital audio interface (XLR). If **embedded** is selected, the module will extract the audio from one of the eight available stereo pairs that can be embedded in an SDI stream.

To specify the audio input:

1. Click on the **Input** tab.
2. Choose an option from the **Audio Input** box.
3. Click **Apply**.

Audio Group (SDI only)

When using embedded audio, select from one of four possible groups.

To specify the audio group:

1. Click on the **Input** tab.
2. Choose an option from the **Audio Group** box.
3. Click **Apply**.

Audio Channel (SDI only)

When using embedded audio, within one group there are four channels. It is possible to select two different pairs, 1&2 or 3&4. These will often be a stereo pair but need not be.

To specify the audio group:

1. Click on the **Input** tab.
2. Choose an option from the **Audio Channel** box.
3. Click **Apply**.

Stream Properties

Transport Protocol

The encoder transmits its stream as an MPEG-2 transport stream carried over UDP or RTP. The default setting is UDP. RTP can be a useful diagnostic tool as RTP packets carry a sequence number and this can be used to check whether all packets arrive at a receiving device.

To specify the transport protocol:

1. Click on the **Stream** tab.
2. Choose an option in the **Transport Protocol** box.
3. Click **Apply**.

Destination Address

By default the Encoder sends its stream addressed to the automatically selected multicast address 239.192.x.y, where x and y are the last two digits of the device's own IP address. However, the destination address can be changed as desired by the administrator to a single or multiple unicast/multicast address(es).

To specify automatic address selection:

1. Click on the **Stream** tab.
2. Choose **Automatic** in the **Destination Address Selection** box.
3. Click **Apply**.

To specify a single destination address:

1. Click on the **Stream** tab.
2. Choose **Manual (Single)** in the **Destination Address Selection** box.
3. Enter the multicast or unicast address in the **Destination Address** field.
4. Click **Apply**.

To specify multiple destination addresses:

1. Click on the **Stream** tab.
2. Choose **Manual (Multiple)** in the **Destination Address Selection** box.
3. Enter the multicast or unicast addresses and ports for each stream
4. Check the box to enable each stream as appropriate.
5. Click **Apply**.

Ports

By default, the stream is sent to the UDP port 49408. The port can be altered by the administrator as desired.

To specify the ports:

1. Click on the **Stream** tab.
2. Enter a value in the **Destination Port** box.
3. Click **Apply**.

IP TTL

By default, the stream is transmitted with an IP TTL of 7. The TTL can be set to any value between 0 and 255 to allow operation across different network topologies.

To specify the IP TTL:

1. Click on the **Stream** tab.
2. Enter a value between 0 and 255 in the **IP TTL** box.
3. Click **Apply**.

IP TOS

By default, the stream is sent with an IP TOS value of 1. The value can be set between 0 and 255, though you should take care to set a value appropriate to your network and if necessary refer to RFC 2474 when choosing the value to set.

To specify the IP TOS:

1. Click on the **Stream** tab.
2. Enter a value between 0 and 255 in the **IP TOS** box.
3. Click **Apply**.

Stream on boot

When this option is selected, the encoder will automatically start to stream when it starts up (assuming the AV source is on). Deselect this if you do not want the stream to start immediately on boot. The default setting is for stream on boot to be enabled.

To specify the stream on boot setting:

1. Click on the **Stream** tab.
2. Check or un-check the **Stream On Boot** box as required.
3. Click **Apply**.

Encoding

The encoder has a number of encoding options which can be configured for both video and audio. It is also possible to disable video or audio encoding in order to transmit audio-only or video-only streams.

Video Encoding

Video encoding is enabled by default. On the PRO/RGBS encoder this can be disabled.

To enable/disable video encoding:

1. Click on the **Encoding** tab.
2. Check or un-check the **Video Enabled** box as appropriate.
3. Click **Apply**.

MPEG Standard

The video can be encoded as **MPEG-2** (default) or **MPEG-4**. MPEG-4 generally requires a lower bandwidth for the same quality as MPEG-2. You may need to experiment to get the image quality at the bit rate you want.

Note: In MPEG-4 mode, the encoding scheme used is MPEG-4 Part 2 Simple Profile.

To specify the MPEG standard:

1. Click on the **Encoding** tab.
2. Choose an option from the **MPEG Standard** box.
3. Click **Apply**.

Display Resolution

The encoder supports a number of display resolutions as described in **Table 3**. The default setting is D1.

To specify the display resolution:

1. Click on the **Encoding** tab.
2. Choose an option from the **Display Resolution** box.
3. Click **Apply**.

Type	NTSC	PAL
D1	720x480	720x576
VGA	640x480	640x576
Half D1	352x480	352x576
CIF	-	352x288
SIF	352x240	-
QVGA	320x240	320x288
QCIF	176x144	176x144

Table 3 - Supported Resolutions

Note: the web interface describes NTSC 352x240 as CIF but in reality it is SIF.

Video Bitrate

The device can be configured to transmit its stream with **constant** bitrate (CBR) or **variable** bitrate (VBR). For a CBR stream, the rate at which this stream is sent can also be configured. For VBR, the maximum and average bitrate can be configured. The allowable bitrates depend on the display resolution (see above). The default setting is 4Mbps CBR at D1 resolution.

For best picture quality, use D1 resolution with CBR and a bitrate of 4Mbps or greater. For best use of bandwidth use VBR and/or a lower bitrate and/or a lower resolution, although this will result in degradation of picture quality.

To specify the bitrate type:

1. Click on the **Stream Props** tab.
2. Choose an option in the **Bit Rate Mode** box.
3. Click **Apply**.

To specify the video bitrate (CBR only):

1. Click on the **Stream Props** tab.
2. Choose an option in the **Video Bit Rate** box.
3. Click **Apply**.

To specify the maximum bitrate (VBR only):

1. Click on the **Stream Props** tab.
2. Choose an option in the **Maximum Video Bit Rate** box.
3. Click **Apply**.

To specify the average bitrate (VBR only):

1. Click on the **Stream Props** tab.
2. Choose an option in the **Average Video Bit Rate** box.
3. Click **Apply**.

Half Frame Rate

Enabling half frame rate can help improve spacial quality at the cost of temporal when streaming at low bit rates. Using this option prevents B frames being used in the GOP structure. By default this setting is disabled.

To specify the half frame rate setting:

1. Click on the **Encoding** tab.
2. Check or un-check the **Half Frame Rate** box as appropriate.
3. Click **Apply**.

Audio Encoding

Audio encoding is enabled by default.

To enable/disable audio encoding:

1. Click on the **Encoding** tab.
2. Check or un-check the **Audio Enabled** box as appropriate.
3. Click **Apply**.

Audio Bitrate

The audio on the encoder is sampled at 48kHz and encoded as MPEG 1 Layer II. The bitrate can be set to values from 48kbps to 384kbps. The default setting is 192kbps.

To specify the audio bitrate:

1. Click on the **Stream Props** tab.
2. Choose an option in the **Audio Bit Rate** box.
3. Click **Apply**.

Channel Announcements

The Encoder uses SAP (Session Announcement Protocol) to announce its stream (channel) to receiving devices. Included in the announcements are the name of the Encoder and the multicast address and port on which the stream is sent. The following options allow some additional information to be put into the announcements.

Channel number

The channel number will be used by Exterity IPTV receivers and PC clients to produce an ordered list of channels.

To specify the channel number:

1. Click on the **Announcements** tab.
2. Enter a value between 0 and 999 in the **Channel Number** box.
3. Click **Apply**.

Groups

The available channels across a network of Exterity devices can be split into groups e.g. *Sport*, *Children*, *Adult*, allowing the administrator to configure receiving devices to receive only a subset of available channels. By default, an Encoder announces itself in the *all* group. Use the groups option to put the device into one or more specific groups.

To add the device to a group or groups:

1. Click on the **Announcements** tab.
2. Enter a comma separated list of group names e.g. **teachers,pupils,administrators** in the **Groups** box.
3. Click **Apply**.

To remove the device from every group (i.e. add the device to the all group):

1. Click on the **Announcements** tab.

2. Enter **all** in the **Groups** box.
3. Click **Apply**.

Announce Local Stream

This option allows the administrator to turn on/off channel announcements.

To configure the announcement setting:

1. Click on the **Announcements** tab.
2. Check or un-check the **Announce Local Stream** box as appropriate.
3. Click **Apply**.

Remote Control

In order to use the infra-red transmitter to control the AV source, it is necessary to obtain a configuration file with the remote control codes for that particular device. Contact your Systems Integrator or Reseller in order to obtain a configuration file.

IR Type

To download an IR config file:

1. The device uses TFTP to download new remote control config files from a TFTP server. To update the config file, first ensure that the correct TFTP server IP address is specified in the **Maintenance** page, and that the TFTP server is running.
2. Save the configuration file in the following directory on the TFTP server.

   `<root>/remotes/<manufacturer>/<type>/<manufacturer>_<type>_<id>.conf`

   For example:

   `<root>/remotes/sony/dvd/sony_dvd_1.conf`
3. Click on the **Remote** tab.
4. Enter the name of the configuration file in the **IR Remote Control Type** box.
5. Click **Apply**. The new configuration file is downloaded automatically from the TFTP server.

Master IR Client

By default, any device on the network can send remote control commands to the Encoder. To allow only one device to do this, configure that device as the Master IR Client.

To specify the master IR client:

1. Click on the **Remote** tab.
2. Enter an IP address in the **Master IR Client Address** box.
3. Click **Apply**.

To remove the master IR client:

1. Click on the **Server Props** tab.
2. Enter 0.0.0.0 in the **Master IR Client Address** box.
3. Click **Apply**.

Management Settings

Web interface authentication

By default, a username/password pair of admin/labrador is required to gain access to the web interface. The password can be changed by the administrator as required

To change the admin password:

1. Click on the **Authentication** tab.
2. Enter the desired password in both **Password** boxes.
3. Click **Apply**.

Maintenance

This section describes various maintenance tasks. It covers:

- Setting the TFTP server
- Restoring the encoder to factory default settings
- Rebooting the encoder
- Upgrading the encoder's firmware
- Export/import configuration

TFTP Server

The device uses TFTP to download new firmware releases and remote control configuration files. For this to operate correctly, the device must be configured with the IP address of the TFTP Server on the network.

To specify a TFTP server IP address:

1. Click on the **Maintenance** tab.
2. Enter the IP address of the TFTP server in the **TFTP Server** box.
3. Click **Apply**.

Restarting the encoder

You can restart the encoder at any time.

To restart the encoder:

1. Click on the **Maintenance** tab.
2. Click **Reboot Server**.

Upgrading the encoder firmware

By upgrading the encoder's firmware regularly, you can ensure that you are always using the most recent encoder software.

WARNING: Do not switch the encoder off while the upgrade process is running. The process takes several minutes, during which time the LED flashes alternately slow and fast.

To upgrade the encoder to a new version of firmware:

1. Ensure that the TFTP server is running.
2. Ensure that the following firmware file is hosted correctly in the root directory of the TFTP server:

   `encoder_full.srec`
3. Click on the **Maintenance** page.
4. Ensure that the **TFTP Server** address is configured correctly (see above).
5. Ensure that the **Firmware filename** is `encoder_full.srec` (or matches the name of the firmware file if this is different).
6. Click **Upgrade Firmware**.

Restoring factory defaults

You can return the encoder to its factory default configuration.

Note: If you restore the encoder to factory default settings, you will lose all previously saved settings.

To restore the encoder factory default settings:

1. Click on the **Maintenance** tab.
2. Click the **Return to factory defaults** button.

Export/import configuration settings

Once you have configured the receiver, you can store your configuration settings in a single file. You can use the file to restore your settings should you need to. You can also use a saved configuration to replicate identical settings on multiple devices.

NOTE: Device naming and IP addressing information is not exported/imported. This means that a configuration file can be imported to multiple units.

To export configuration settings:

1. Ensure that the TFTP server is running.
2. Click on the **Maintenance** page.
3. Ensure that the **TFTP Server** address is configured correctly (see above).
4. Enter a name for your configuration archive in the **Export filename** box.
5. Click **Export configuration**.
6. The configuration file is uploaded to the root directory of the TFTP server

To import configuration settings:

1. Ensure that the TFTP server is running
2. Click on the **Maintenance** page.
3. Enter the name of the configuration archive that you are using in the **Import Filename** box.
4. Click **Import configuration**.

Logging

The encoder saves historical information about internal events within the device to its log file. This can be useful in troubleshooting problems with the device.

Time server

The encoder uses NTP to maintain accurate time on the device, using the time server specified. This is useful when examining the device log file as accurate time information will be attached to log messages.

If a time server is supplied to the device by the DHCP server, this will be used if the administrator has not already specified a time server.

To specify a time server:

1. Click on the **Maintenance** page.
2. Enter the IP address or the host name of the time server in the **Time Server** box.
3. Click **Apply**.

Local logging

All log file information is automatically saved locally.

To view the log file:

1. Click on the **Logging** page
2. Click the **Show log** button, resulting in the log being displayed in the browser window.

Remote logging

To save device log information to a remote server, you need to install a syslog server, such as the Kiwi Enterprises Syslog Daemon.

To configure remote logging:

1. Click on the **Logging** page.
2. Select **Local and Remote Logging**.
3. In **Syslog server**, enter the IP address or host name of the syslog server where the log files are to be stored.
4. In **Syslog port**, enter the port number on the syslog server. The default value is 514.
5. For **Logging level**, select an option ranging from **0-Emergency** to **7-Debug**, where 0 represents the least debug information and 7 represents the most.
6. Click **Apply**.

7 Admin Interface

In certain circumstances it may not be possible to manage an encoder via its web interface. For these situations a text based admin interface is provided which is available via the serial interface (marked admin on the rear panel of the unit) or via telnet.

See APPENDIX A for details of how to connect to the serial admin port.

Once connected, log in using username **admin** and password as for the web interface (default **labrador**).

Admin interface pages

Main page

When successfully logged in, the main page is displayed as shown below

```
                        MPEG Encoder Admin Program
          encoder [1.2.1] release #3 Tue Mar 11 09:35:52 GMT 2008

      1) Show syslog
      2) Show Bootloader params
      3) Show Network Config
      4) Set Network Config
      5) Set Admin Password
      6) Run a shell
      7) Return to factory defaults
      8) Upgrade
      9) Reboot
      10) Exit
```

Show syslog

This displays the device log file.

Show bootloader params

This page displays the internal configuration used by the bootloader.

Show network config

This page displays the IP addressing information of the device.

Set network config

This page allows the administrator to set the IP address of the device.

Set admin password

Allows the administrator to change the admin password for the serial and web interfaces

Run a shell

This allows the administrator to run a shell as admin.

Return to factory defaults

This page allows the administrator to set all configuration to factory defaults.

Upgrade

This allows the administrator to specify the TFTP server and initiate a firmware upgrade.

Reboot

Reboots the device.

8 Troubleshooting

Problem	Possible Cause	Solution
Device does not appear in IPTV Manager	Network connection faulty or cannot obtain IP address.	Check Ethernet connections or replace cable. Check that DHCP Server is running on network. Check switch settings match unit Ethernet settings.
	PC has firewall configured, blocking SNMP traps.	Disable firewall, or configure firewall to allow UDP port 162 traffic to this application.
	PC has another application listening for SNMP traps.	Close down SNMP trap listener.
IPTV Manager cannot communicate with device	Network connection faulty	See above
	Device has an IP address on a different subnet to the management station	Use a management station configured with an appropriate IP address to manage the device.
	Device is upgrading (indicated by alternately slow and fast LED flash)	Wait for upgrade to complete
Encoder does not appear to be streaming	AV source not connected or powered off.	Check connections and power to AV source. Check the status page to see if the encoder thinks it is attached to a valid video source
	Video interface setting wrong.	Check video interface settings on Encoder and AV device are the same.
	The cabling is incorrect e.g. the Y cable is not attached to the Y BNC	Check cabling.
Device is definitely streaming but client cannot connect to stream	Multicast address is not unique	Particularly if the multicast address was assigned manually check it is unique.
	Client cannot accept MPEG-4	Many clients support only MPEG-2 and not MPEG-4. Make sure the encoder is configured accordingly.
	If using PC client, PC Firewall is preventing video traffic	Disable firewall, or configure firewall to allow traffic to this application.
Device is streaming but video and or audio is broken up on client	Network is not IGMP enabled	Check the configuration of the network switch(es). Check the switch(es) for any errors

	The streaming bit rate exceeds the capability of the client	An Exterity SD Receiver (V2.3.0 or later) will receive up to 8Mbps using CBR. Make sure the rate is this or lower.
After upgrade, the device is still running the old version of firmware.	The correct firmware file is not on the TFTP Server.	Put the correct file on the TFTP Server.
	The TFTP Server address configured for the device is wrong	Check that the TFTP Server address is the address of the machine the TFTP Server is running on.
	The TFTP Server is not running.	Start the TFTP Server.
	The TFTP Server is not configured to send files.	Fix the security settings on the TFTP Server.

APPENDIX A Serial interface connection

The serial admin interface provides the ability to manage a small subset of device functionality e.g. to configure an IP address.

Cabling

To connect to the serial interface use the female DB-9 connector supplied by Exterity (shown in Figure 9.

Figure 9 - DB-9 to RJ45 serial adaptor

The female DB-9 connector should be plugged into the serial port on a PC. A straight-through network cable should be used between the RJ45 socket on the adaptor and the admin port on the Exterity device.

Note that although the cable fits, the admin port should not be connected to the Ethernet port on a PC.

Connector Wiring

If you do not have a connector you can make one using the details shown in Figure 10, Figure 11 and Table 4.

DB9 Pin No	Description	RJ45 Pin No
2	TxD	8
3	RxD	2
5	GND	4

Table 4 - Serial Pin Out

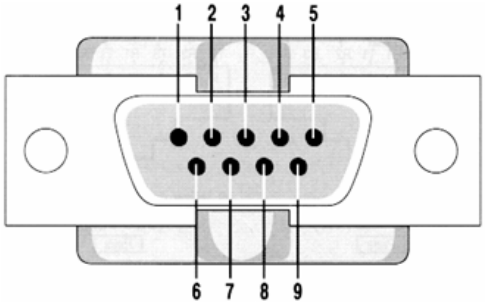


Figure 10 DB-9 connector

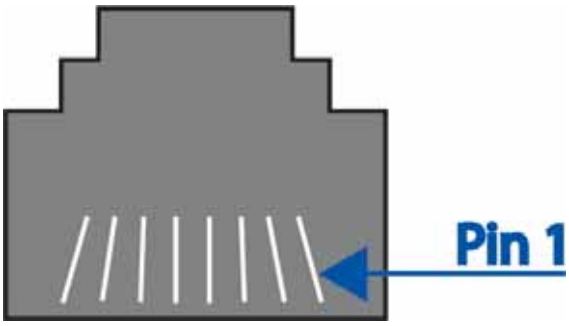


Figure 11 RJ45 connector

Opening a Session

Open a terminal program such as Hyperterminal (this can be found on a standard Windows PC). Set up the serial port with the following settings (see example in Figure 12):

- Baud rate: 115200
- Data bits: 8
- Parity: none
- Stop bits: one
- Flow control: none

The program should now connect and present a login prompt if the return key is pressed.

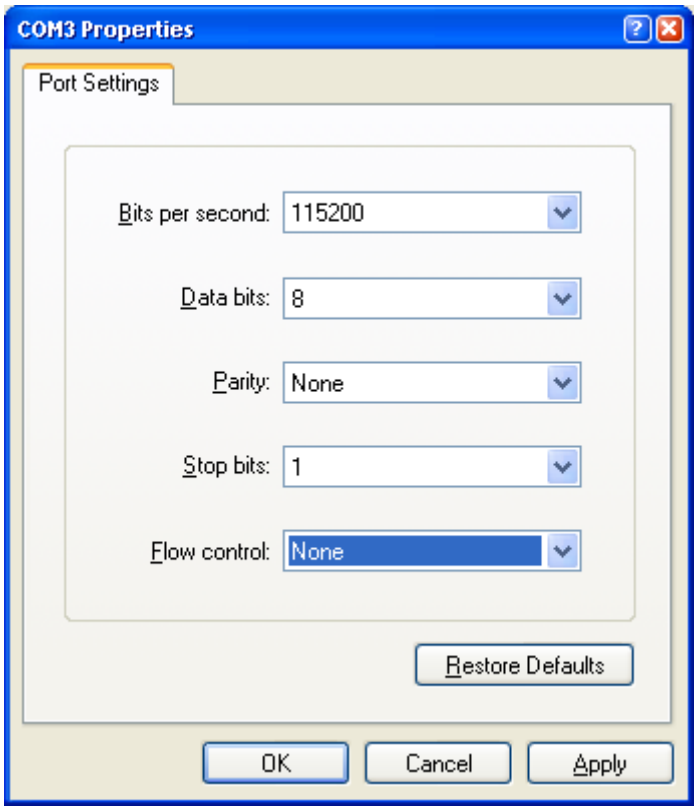


Figure 12 Serial port settings

APPENDIX B Support and contact information

Technical Support for Exterity products is provided by authorised Systems Integrators and Resellers. Please contact your Systems Integrator or Reseller with any Support issues.